REMARKS

Claims 8-10, 14-22 and 31-41 are pending in this application. Entry of these remarks is requested to place the claims in condition for allowance. Claims 8-10, 14-16, 20-21, 31-35 and 39-41 stand rejected under 35 U.S.C. §103(a), as being unpatentable over Okumura (JP 06-299312). Claims 8-10, 14-22 and 31-41 stand rejected under 35 U.S.C. §103(a), as being unpatentable over Okumura, in view of Applicant's disclosure of the prior art.

Remarks Directed to the Rejection of Claims 8-10, 14-16, 20-21, 31-35 and 39-41 Under 35 U.S.C. §103(a), as Being Unpatentable Over Okumura (JP 06-299312)

Okumura Teaches Away from the Present Invention

The final Office Action mailed September 21, 2006 states in paragraph 4:

> Okumura discloses steel having an iron-aluminide intermetallic alloy layer with a thickness of about 1 micron or less (but with comparative examples of up to 5 microns - e.g. see comparative examples in Table 2) and an aluminum content of 20-80 wt.% (e.g. see paragraph [0014] and Table 2). The ability of the steel substrate to be miscible with molten zinc would be inherent to the composition of the article. An upper zinc layer is formed (e.g. paragraph [0010]). Although Okumura claims an iron-aluminide intermetallic alloy layer thickness of 1 micron or less and applicant claims a thickness of "greater than 1 micron" (e.g. claim 8, line 4), the thicknesses of 1 micron and "greater than 1 micron" are so close that, *unless shown otherwise, one of ordinary skill in the art would not expect there to be a patentable distinction between the properties of the two thicknesses.* See MPEP 2144.05 for the obviousness of range endpoints that approximate each other. (emphasis added)

Turning to MPEP 2144.05, this section states in part "a *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have *expected them to have the same properties. Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985)" (emphasis added). MPEP 2144.05 also states that "A *prima facie* case of obviousness may also be rebutted by showing that

the art, *in any material respect, teaches away* from the claimed invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997)" (emphasis added). And although the Federal Circuit in the *In re Geisler* opinion rejected the applicant's arguments that the prior art taught away from the invention at issue, the facts in this prosecution are distinct and very different.

In *In re Geisler*, the court held that the statement "thickness of a protective layer should be not less than 100 Angstroms" in an issued patent to Zehender did not teach away from a claimed range of "50 to 100 Angstroms" because "Zehender suggest[ed] that there [were] benefits to be derived from keeping the protective layer as thin as possible". Thus while Zehender expressed a preference for a thicker protective layer of 200-300 Angstroms, at the same time the patent provided motivation for one of ordinary skill in the art to focus on thickness levels at the bottom of Zehender's "suitable" range – about 100 Angstroms – and to explore thickness levels below that range. The statement that "in general, the thickness of the protective layer should be not less than about 100 Angstroms" fell short of the kind of teaching that would discourage one of skill in the art from fabricating a protective layer of 100 Angstroms or less. The opposite is true for the teaching in Okumura.

First, paragraph [0009] of Okumura, according to machine translation, states in part:

> However, since itself of the intermetallic-compound layer which consists of Fe-aluminum is also hard, it is weak and a processing student *will deteriorate if the thickness exceeds 1 micrometer*, according to this invention, it *is necessary to set to 1 micrometer or less thickness* of the intermetallic-compound layer which consists of Fe-aluminum. (emphasis added)

Second, paragraph [0012] states:

> When there is less content of the aluminum in a melting bath than 0.1% of the weight, growth of the Zn-Fe alloy layer by the reaction of iron and zinc is promoted, on the other hand, when the content of aluminum exceeds 20% of the weight, growth of a Fe-aluminum intermetallic-compound layer becomes excessive, it *becomes impossible to carry out 1 micrometer of the thickness, and both the workability of plating steel materials is degraded remarkably in this way.* (emphasis added)

And finally, paragraph [0020] as professionally translated reads as follows:

> The results for the above described test assessment for each embodiment and comparative example is shown in Table 2. As is clear from Table 2, in accordance with this invention, the surface processed steel materials obtained with *embodiments 1-17 are superior in both anti-corrosiveness and workability. However, with embodiments 1-6* having an aluminum content ratio within the first bath and second bath that does not meet the conditions regulated by this invention, silicon was added to the bath, *and with comparative examples 7-9* having the former method in which processing is performed with a single bath, *the result is that one or both factors of anti-corrosiveness and workability are inferior.* Furthermore, because the aluminum concentration within the first bath for comparative example 1 is low, an Fe-Al intermetallic compound layer is not confirmed, and the Zn-Fe compound layer is excessively grown. (emphasis added)

The teachings in paragraphs [0009], [0012] and [0020] go far beyond disclosing a non-preferred embodiment and clearly teaches away from the present invention.

In addition, MPEP 2123 quotes the Federal Circuit as holding that a "prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed." Again, Okumura does the opposite, i.e. when Okumura states:

(1) in paragraph [0009] that the intermetallic-compound layer will deteriorate if the thickness exceeds 1 micrometer;

(2) in paragraph [0012] the emphasis regarding aluminum being within certain ranges such that a 1 micrometer thickness can be obtained; and

(3) in paragraph [0020] that embodiments 1-6 and 7-9 (the only examples showing a thickness greater than 1.0 micron) exhibit inferior factors of anti-corrosiveness and/or workability,

the disclosure *clearly* criticizes, discredits and discourages the thickness range claimed in the present invention.

Furthermore, and in contrast to *Titanium Metals Corp. of America v. Banner*, Okumura discloses to one skilled in the art that the claimed ranges of thickness in the present invention and the prior art ranges would have *very different properties*. Stated differently, one of ordinary skill in the art *would* expect there to be a patentable distinction between the properties of the two thicknesses.

And finally, MPEP Section 2145 states that proceeding contrary to accepted wisdom is evidence of nonobviousness and that known disadvantages in old devices which would naturally discourage search for new inventions may be taken into account in determining obviousness. *United States v. Adams*, 383 US 39, 52, 148 USPQ 479, 484 (1966). Applicant submits that the disadvantages of the Okumura teachings would naturally discourage search for new inventions in this thickness range and the present invention's proceeding contrary to this teaching is evidence of nonobviousness.

In summary, it is clear that the Okumura reference falls outside the intent of MPEP 2144.05, 2123, 2145 and controlling case law wherein comparative examples and nonpreferred embodiments are held not to teach away from a reference.

Cited Comparative Examples in Okumura Are Not Comparative

Paragraph 4 of the Final Office Action mailed September 21, 2006 also states "In any event, Okumura clearly shows comparative examples having intermetallic layers of 1.5 microns, 2 microns, 3 microns and 5 microns (e.g. see the comparative examples in Table 2). See MPEP 2123 for use of comparative embodiments to reject." However, Applicant submits the examples mentioned above are not comparative and should not be used as such. The reasoning of this statement follows.

Okumura teaches in paragraph [0014]:

> After immersing steel materials in the first bath and forming a Fe-aluminum intermetallic-compound layer, the coat layer to which 20-80% of the weight of aluminum and the remainder essentially become the upper layer of a Fe-aluminum intermetallic-compound layer from zinc is made to form by pulling up steel materials from the first bath, and subsequently to the second bath being immersed according to this invention. As for the presentation of this second bath, 20-80% of the weight of aluminum and the remainder essentially consist of zinc.

Table 1 below provides the Al content (cols. 2 and 8) for the molten metal bath(s) used to produce the embodiments labeled in the first column. This table and paragraph [0020] illustrate that the first group of listed embodiments 1 through 17 fall within the scope of the invention and the second group of listed embodiments 1-9 fall outside the scope of the invention. Table 2 below provides the thickness of the coatings for each embodiment.

Thus Okumura is clear in disclosing that the invention of this reference is comprised of a first molten metal bath with an aluminum content between 0.1-20 wt% percent and a second molten metal bath with aluminum content between 20-80 wt%. Furthermore, Okumura states in paragraph [0010] "In the plating steel materials by this invention, the upper layer is a coat layer which 20-80 % of the weight aluminum and the remainder essentially become from zinc," thereby teaching the composition or compositional range of the coating when produced according to the invention as outlined in paragraph [0014]. Therefore, embodiments 1-17, produced according to the invention, have a known compositional range of between 20-80 wt% aluminum and are in fact comparative examples.

Table 1

	第一溶体処理					第二溶体処理					
	Al含有量 (%)	添加元素	溶解温度 (℃)	保温温度 (℃)	保温時間 (秒)	第一溶体後処理	Al含有量 (%)	添加元素	溶解温度 (℃)	保温温度 (℃)	溶湯時間 (秒)
実施例1	0.1	無し	450	470	2	無し	5.5	無し	600	620	2
2	1	無し	450	470	2	無し	5.5	無し	600	620	2
3	5	無し	450	470	2	無し	5.5	無し	600	620	2
4	20	無し	500	520	2	無し	5.5	無し	600	620	2
5	0.15	無し	450	470	2	無し	20	無し	500	520	2
6	0.15	無し	450	470	2	無し	50	無し	600	620	2
7	0.15	無し	450	470	2	無し	70	無し	630	670	2
8	0.15	無し	450	470	2	無し	80	無し	650	670	2
9	0.15	0.02%Pb	450	470	2	無し	5.5	無し	600	620	2
10	0.15	0.02%Sb	450	470	2	無し	5.5	無し	600	620	2
11	0.15	無し	450	470	5	無し	5.5	無し	600	620	2
12	0.15	無し	450	470	2	無し	5.5	無し	500	620	1
13	0.15	無し	450	470	2	無し	5.5	無し	500	620	5
14	0.15	無し	450	470	2	無し	5.5	無し	600	620	10
15	0.15	無し	450	470	2	気体攪拌	5.5	無し	600	620	2
16	0.15	無し	450	470	2	電磁的エッチング	5.5	無し	600	620	2
17	0.15	無し	450	470	2	徐冷的時効	5.5	無し	600	620	2
比較例1	0.05	無し	450	470	2	無し	5.5	無し	600	620	2
2	30	無し	520	540	2	無し	5.5	無し	800	820	2
3	50	無し	600	620	2	無し	5.5	無し	600	620	2
4	0.15	無し	450	470	2	無し	15	無し	600	620	2
5	0.15	無し	450	470	2	無し	85	無し	650	670	2
6	0.15	無し	450	470	2	無し	90	無し	670	690	2
7							5.5	0.5%Si	600	620	2
8							5.5	1.5%Si	600	620	2
9							5.5	5.0%Si	600	620	2

Table 2

	めっき付着量 (g/m²)	Fe-Al 金属間化合物層厚さ (μm)	めっき層中 Al%	めっき層中 Si%	耐食性	加工性
実施例1	80	0.2	55	0	◎	○
2	80	0.3	55	0	◎	○
3	80	0.5	56	0	◎	○
4	80	1	58	0	◎	○
5	80	0.2	55	0	◎	○
6	80	0.2	20	0	○	◎
7	80	0.2	50	0	◎	○
8	80	0.2	70	0	◎	○
9	60	0.2	60	0	◎	○
10	60	0.2	55	0	◎	○
11	80	0.2	55	0	◎	○
12	80	0.2	55	0	◎	○
13	80	0.2	55	0	◎	○
14	80	0.2	55	0	◎	○
15	80	0.2	55	0	◎	○
16	80	0.2	55	0	◎	○
17	80	0.2	55	0	◎	○
比較例1	80	−(Zn-Fe合金層生成)	55	0	◎	×
2	80	2	60	0	◎	×
3	80	5	62	0	◎	×
4	80	0.2	15	0	×	◎
5	80	0.2	87	0	×	△
6	80	0.5	92	0	×	△
7	80	3	50	1.0	△	×
8	80	2	60	2.0	△	×
9	80	1.5	57	5.5	△	△

In contrast, embodiments 1-6 represent samples produced by dipping steel into two molten metal baths with compositions that are not within the claimed invention and embodiments 7-9 represent samples produced by dipping steel into one molten bath. Since a chemical composition of the coating itself is not provided in the patent application, and Okumura discloses that these samples "do not meet the conditions regulated by this invention" the chemical compositions of these intermetallic-compound layers are not within the compositional range of 20-80 wt% percent aluminum and in fact are unknown. With the composition unknown,

it is not even certain that an Fe-aluminide coating is present on the sample and thus these embodiments not comparative examples for the present invention.

In summary, Applicant submits that Okumura teaches away from the present invention and that the second group of embodiments 1-9 shown in Tables 1 and 2 are not comparative examples. Given the above remarks, withdrawal of the rejection of claims 8-10, 14-16, 20-21, 31-35 and 39-41 under 35 U.S.C. §103 as being unpatentable over Okumura is requested.

Remarks Directed to the Rejection of Claims 8-10, 14-22 and 31-41 Under 35 U.S.C. §103(a), as Being Unpatentable Over Okumura in View of Applicant's Disclosure of the Prior Art

The above remarks regarding Okumura are herein incorporated by reference. Given these remarks, withdrawal of the rejection of claims 8-10, 14-22 and 31-41 under 35 U.S.C. §103 as being unpatentable over Okumura in view of Applicant's disclosure of the prior art is requested.

Summary

Claims 8-10, 14-22 and 31-41 are submitted for consideration. Each claim is believed to be in allowable form and directed to patentable subject matter. Reconsideration and withdrawal of the outstanding rejections and the passing of this application to issuance are solicited. Should the Examiner find to the contrary, he is respectfully requested to contact the undersigned attorney in charge of this application to resolve any remaining issues.

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Respectfully submitted,

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